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THE GEOLOGICAL SOCIETY OF AMERICA®

Booth No. 322 PRELIMINARY, NEW INSIGHTS INTO THE EVOLUTION OF AN EXTANT, 4-5 MA SOIL-GEOMORPHIC SURFACE AND ITS UNIQUE PETROCALCIC HORIZONS, SOUTHERN NEVADA, USA

Tuesday, 6 November 2018
09:00 AM - 06:30 PM
Indiana Convention Center - Halls J-K

Long-lived, relict, soil-geomorphic surfaces with well-developed petrocalcic horizons in their soil profiles result from an unusual contrast between overall geomorphic stability and episodic, erosion, reworking, or recrystallization during Pleistocene-Holocene climate oscillations. Among such landforms, Mormon Mesa, Nevada, may exhibit the oldest, extant soil profile with calcic and petrocalcic soil horizons in North America. The mesa's complex Stage II to Stage VI carbonate horizons are tantalizing for paleoenvironmental analysis and geochronology given an estimated 4-5 Ma age for the onset of pedogenesis. Unfortunately, previous studies of the Mormon Mesa soil suggest that millions of years of erosion, dissolution, and recrystallization events have compromised the resolution and reliability of paleoclimate signatures from pedogenic calcite. Here, we present an overview of new, ongoing research based on profile morphology, soil micromorphology, stable isotope data, and mapping of elemental geochemistry across the mesa surface. We incorporate previously studied sites on Mormon Mesa as well as two newly discovered and previously undescribed sites with younger, inset petrocalcic soil horizons at Flat Top Mesa. Our results provide new resolution on tectonic and climatic events whose signatures may have been averaged or lost within the "massive" Stage VI horizon that is prevalent across most of the mesa. We describe intriguing variations in the occurrence and characteristics of micromorphological features including laminae, pisoliths, and ooids between horizons and sites, and we provide preliminary laboratory and spatial analyses of samples from mini-playas, dunes, and arroyos which characterize the broader mesa surface.

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Booth No. 322

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